

# My patient is confused about “ablation”

2019 Cardiology Day

September 27, 2019

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After 2019 Cardiology Day presentation  
my doctor is now confused about ablation

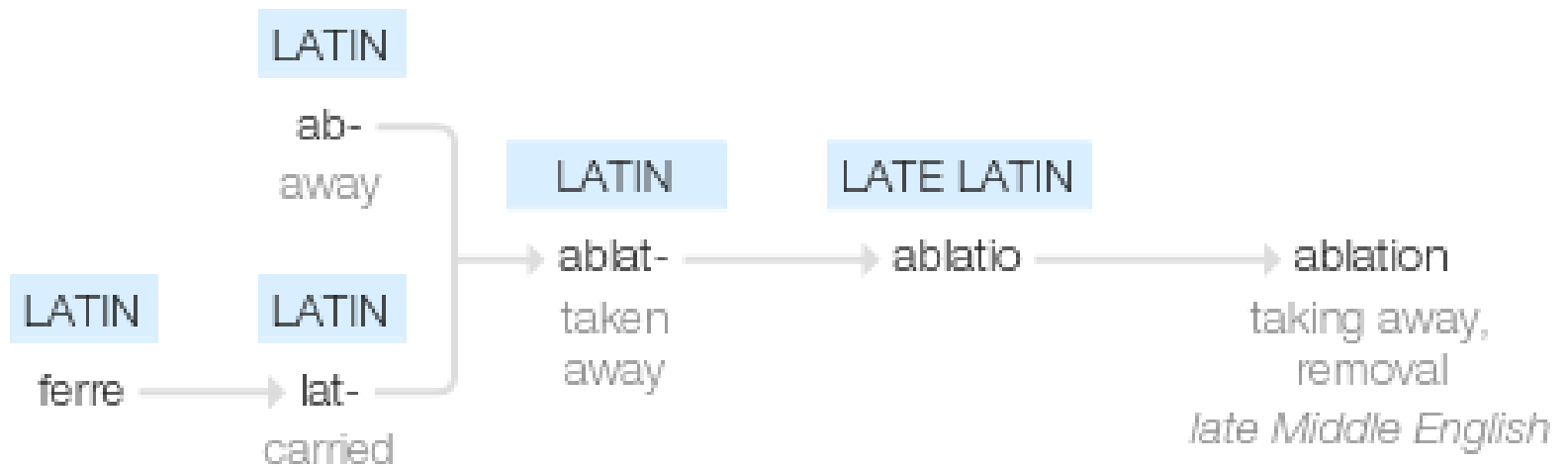
Proposed title for 2020 Cardiology Day

# Faculty/Presenter Disclosure

- **Faculty:** **Alex Tischenko**
- **Relationships with commercial interests:**
  - **Grants/Research Support:** None
  - **Speakers Bureau/Honoraria:** None
  - **Consulting Fees:** None
  - **Other:** Performing Ablation procedures for living

# Objectives

- ✓ Clarify what is ABLATION
- ✓ Review types of arrhythmia ablation
- ✓ Review role of ablation in treatment of various arrhythmias
- ✓ Success, risk and limitations of cardiac ablation
- ✓ Describe typical ablation procedure – what is patient to expect
- ✓ Pre and post-procedure care



# What is ablation in medicine?

- **In cardiology:**

- **Arrhythmia ablation:**

- **Catheter ablation by RF or Cryo (done by Electrophysiologist (EP specialist))**

- **Surgical ablation** (MAZE, cryo-MAZE, etc – done by cardiac surgeon during cardiac surgery )

- **Alcohol septal ablation** – for LVOT obstruction in HOCM (done by interventional cardiologist)

- **Rotablation** - diamond-coated “drill” for calcific coronary artery stenosis (done by interventional cardiologist)

- **Focal tumor ablation in oncology** (by RFA, MWA, Cryo, EtOH):

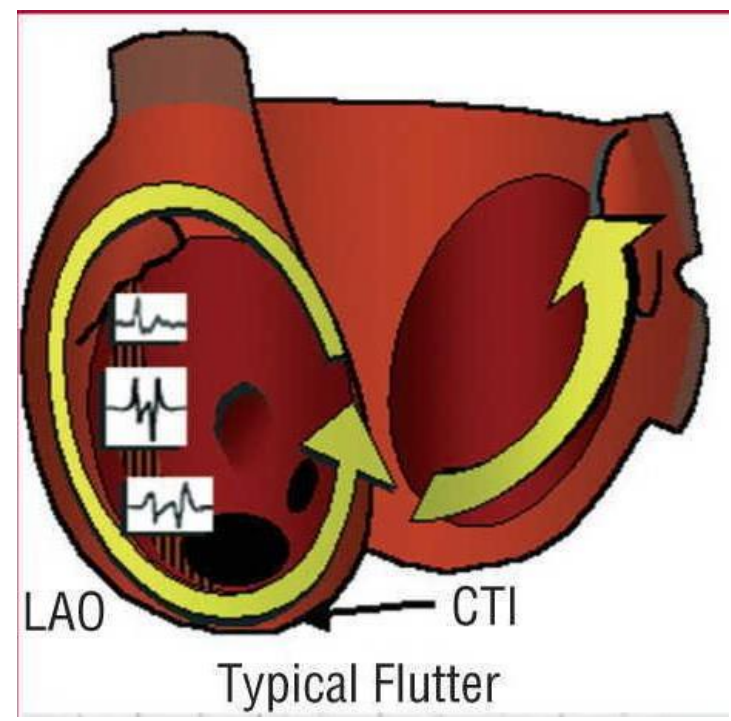
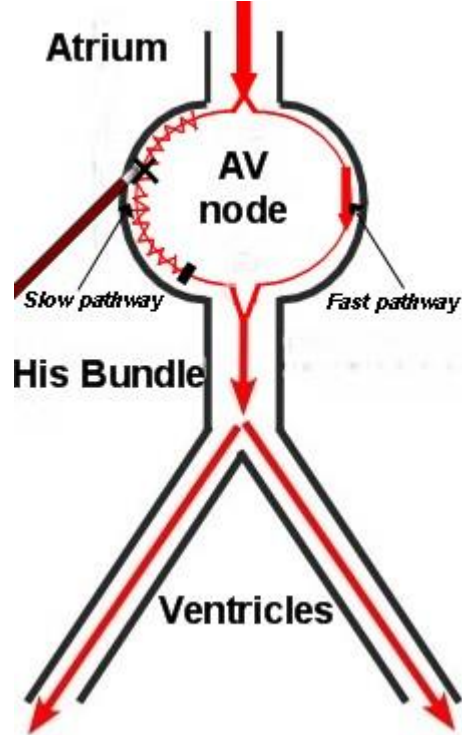
- In liver, lung, kidneys, head & neck tumors, etc

- **Endometrial ablation** - treat abnormal uterine bleeding

- Laser **brain ablation** – for tumors and epilepsy

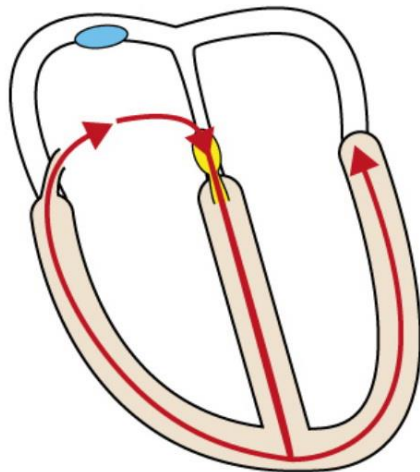
- **Dermal ablation** (mechanical or laser)

- **Bone marrow ablation** (by chemo or radiation before bone marrow Tx)



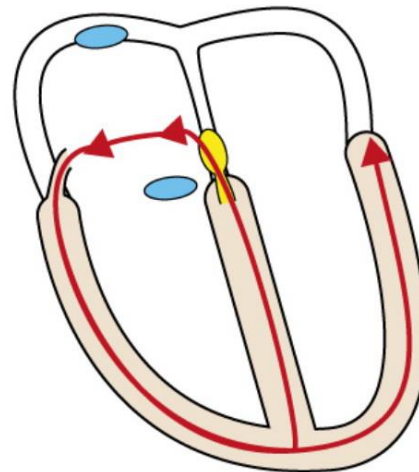
**Orthodromic AVRT**

Antegrade conduction through atrioventricular node

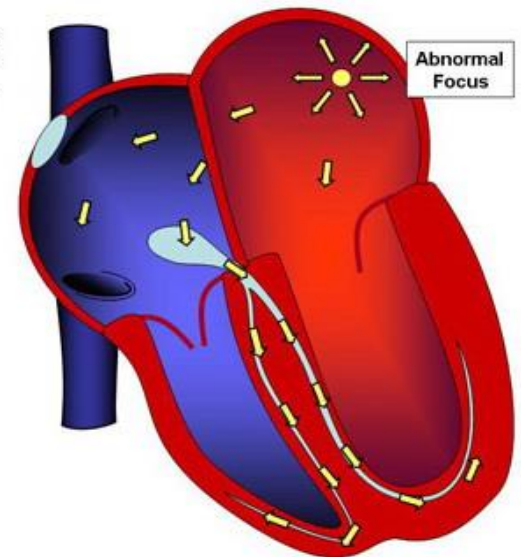


**Antidromic AVRT**

Retrograde conduction through atrioventricular node



Focal Tachycardia (here, in the left atrium)



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## CATHETER ABLATION OF ACCESSORY ATRIOVENTRICULAR PATHWAYS (WOLFF-PARKINSON-WHITE SYNDROME) BY RADIOFREQUENCY CURRENT

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P. DAVID MARGOLIS, M.D., JAMES D. CALAME, R.N., EDWARD D. OVERHOLT, M.D.,  
AND RALPH LAZZARA, M.D.

**Abstract** *Background.* Surgical or catheter ablation of accessory pathways by means of high-energy shocks serves as definitive therapy for patients with Wolff-Parkinson-White syndrome but has substantial associated morbidity and mortality. Radiofrequency current, an alternative energy source for ablation, produces smaller lesions without adverse effects remote from the site where current is delivered. We conducted this study to develop catheter techniques for delivering radiofrequency current to reduce morbidity and mortality associated with accessory-pathway ablation.

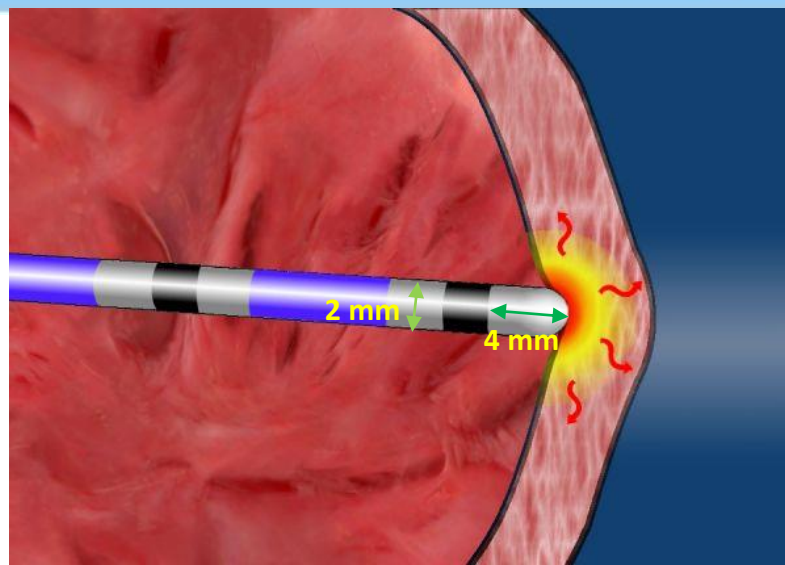
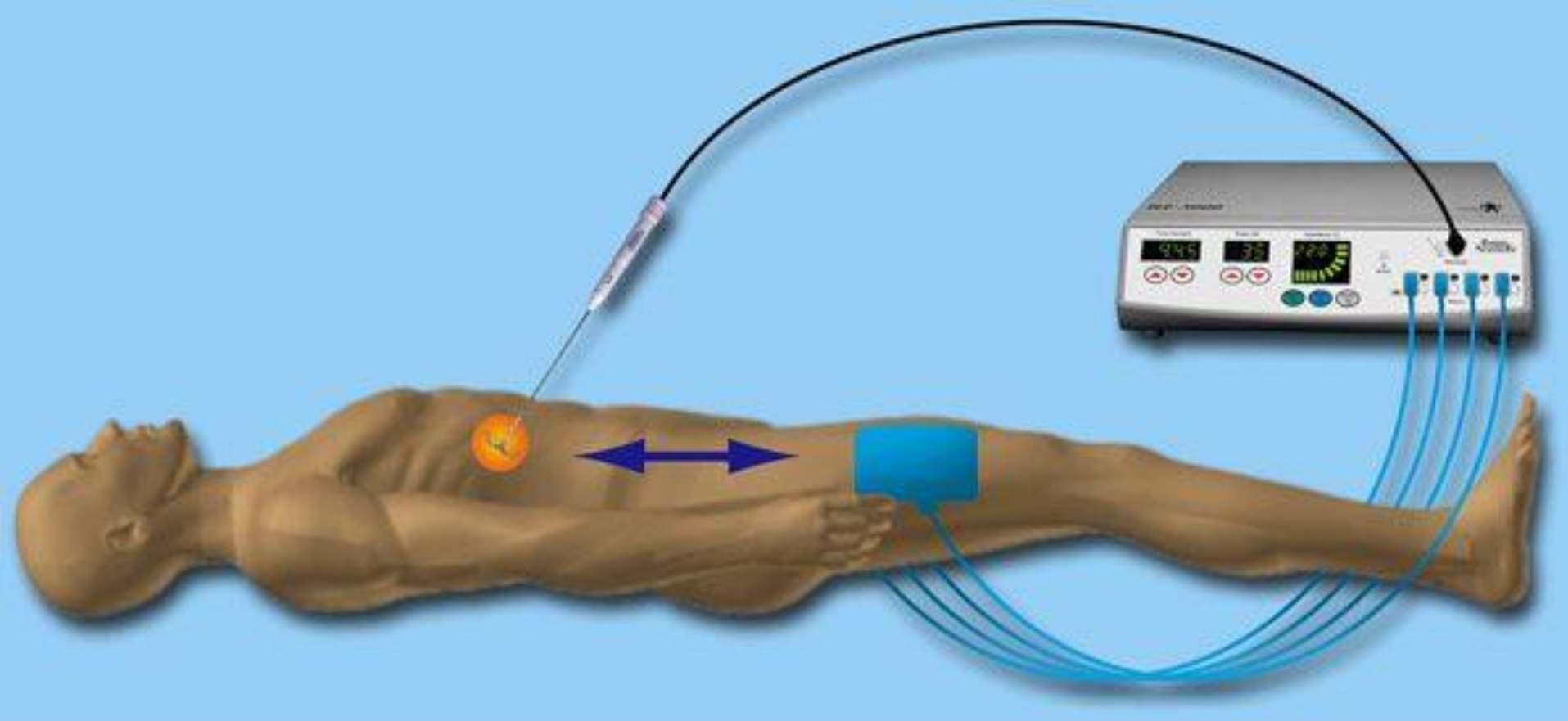
*Methods.* Radiofrequency current (mean power,  $30.9 \pm 5.3$  W) was applied through a catheter electrode positioned against the mitral or tricuspid annulus or a branch of the coronary sinus; when possible, delivery was guided by catheter recordings of accessory-pathway activation. Ablation was attempted in 166 patients with 177 accessory pathways (106 pathways in the left free wall, 13

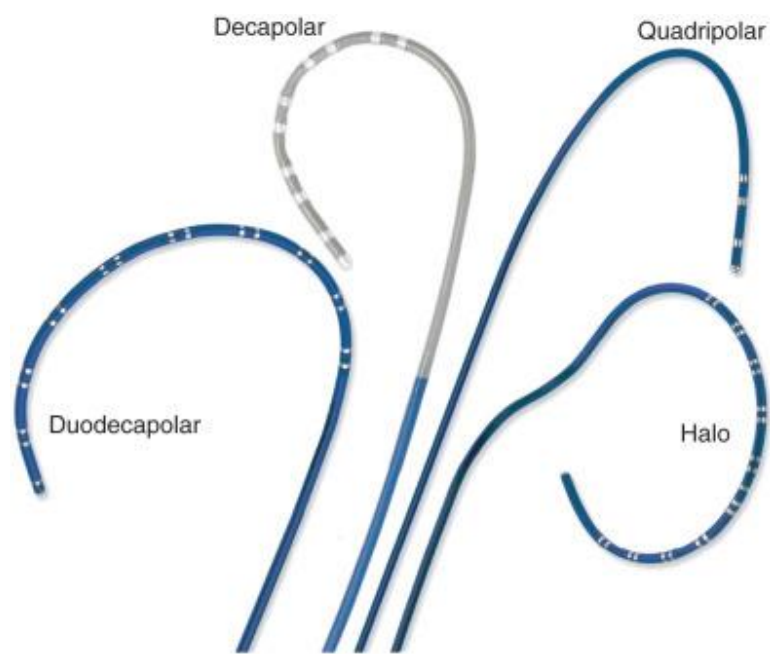
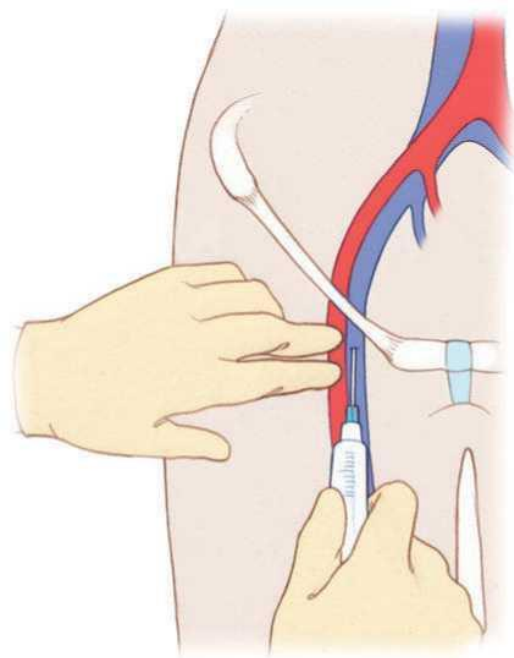
in the anteroseptal region, 43 in the posteroseptal region, and 15 in the right free wall).

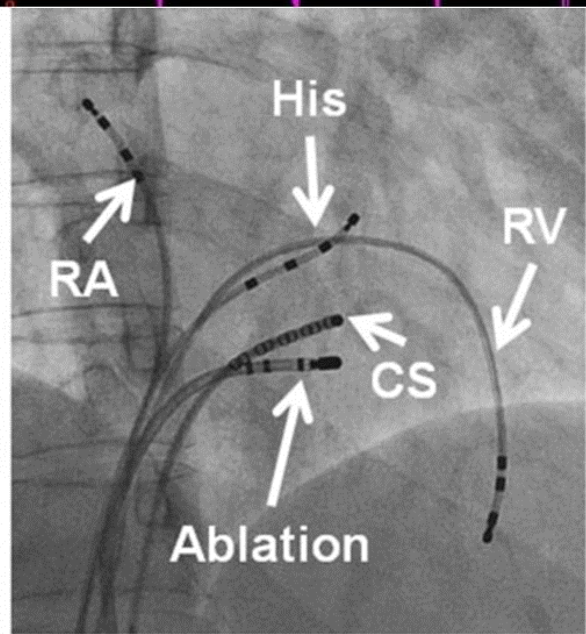
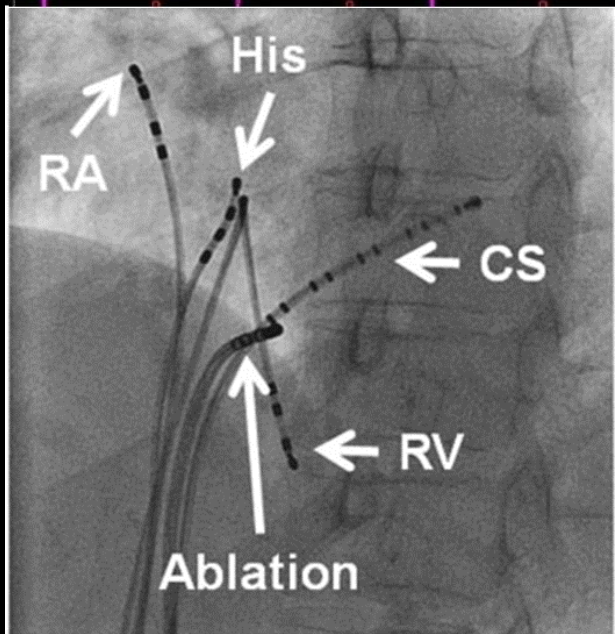
*Results.* Accessory-pathway conduction was eliminated in 164 of 166 patients (99 percent) by a median of three applications of radiofrequency current. During a mean follow-up ( $\pm$ SD) of  $8.0 \pm 5.4$  months, preexcitation or atrioventricular reentrant tachycardia returned in 15 patients (9 percent). All underwent a second, successful ablation. Electrophysiologic study  $3.1 \pm 1.9$  months after ablation in 75 patients verified the absence of accessory-pathway conduction in all. Complications of radiofrequency-current application occurred in three patients (1.8 percent): atrioventricular block (one patient), pericarditis (one), and cardiac tamponade (one) after radiofrequency current was applied in a small branch of the coronary sinus.

*Conclusions.* Radiofrequency current is highly effective in ablating accessory pathways, with low morbidity and no mortality. (N Engl J Med 1991; 324:1605-11.)



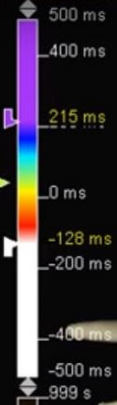




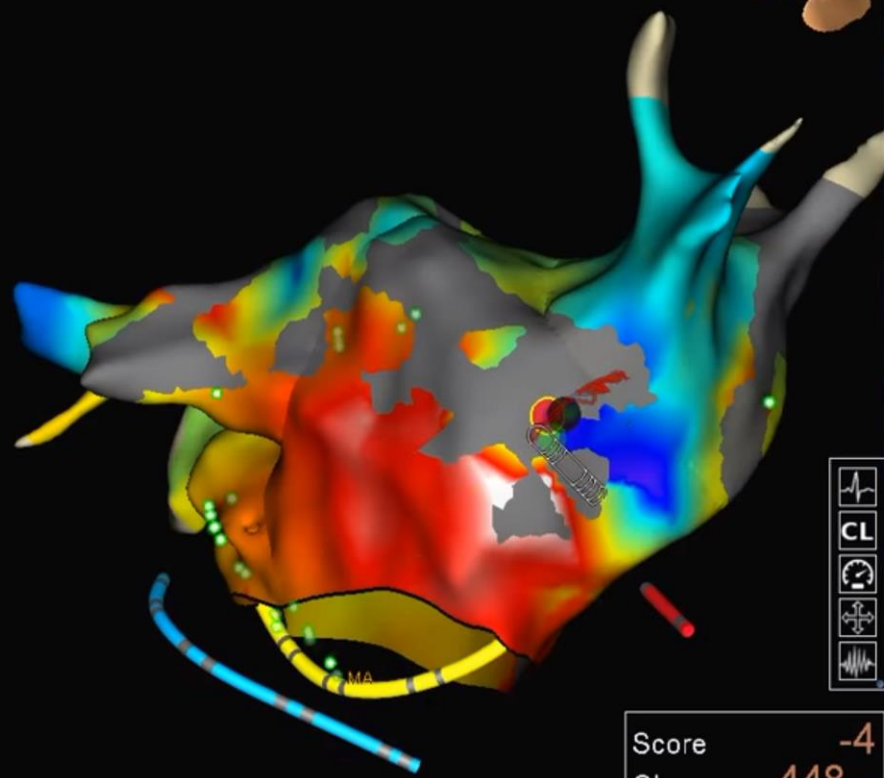
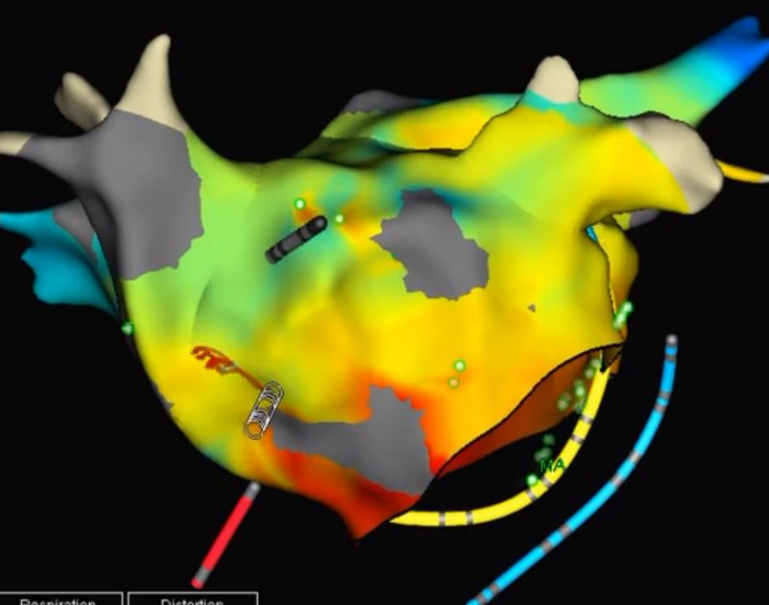


FLUTTER

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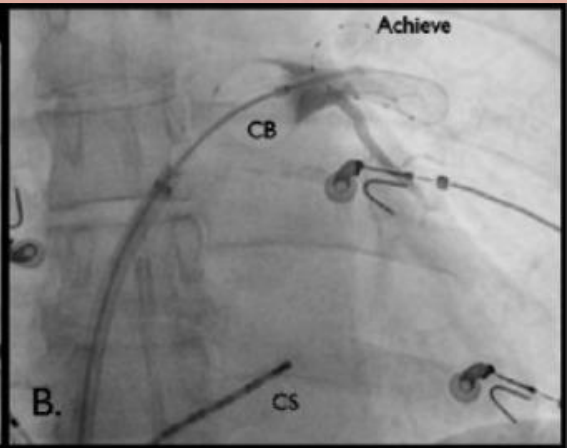
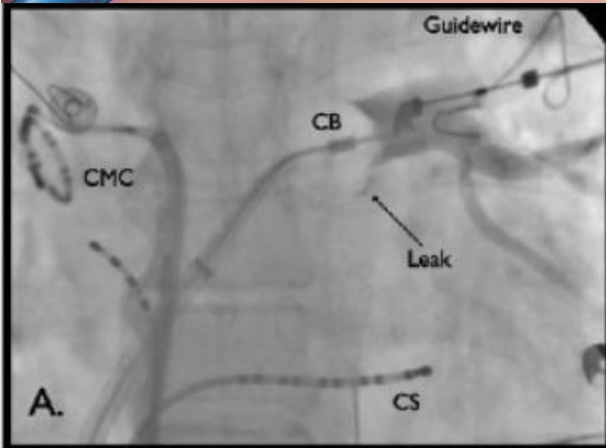
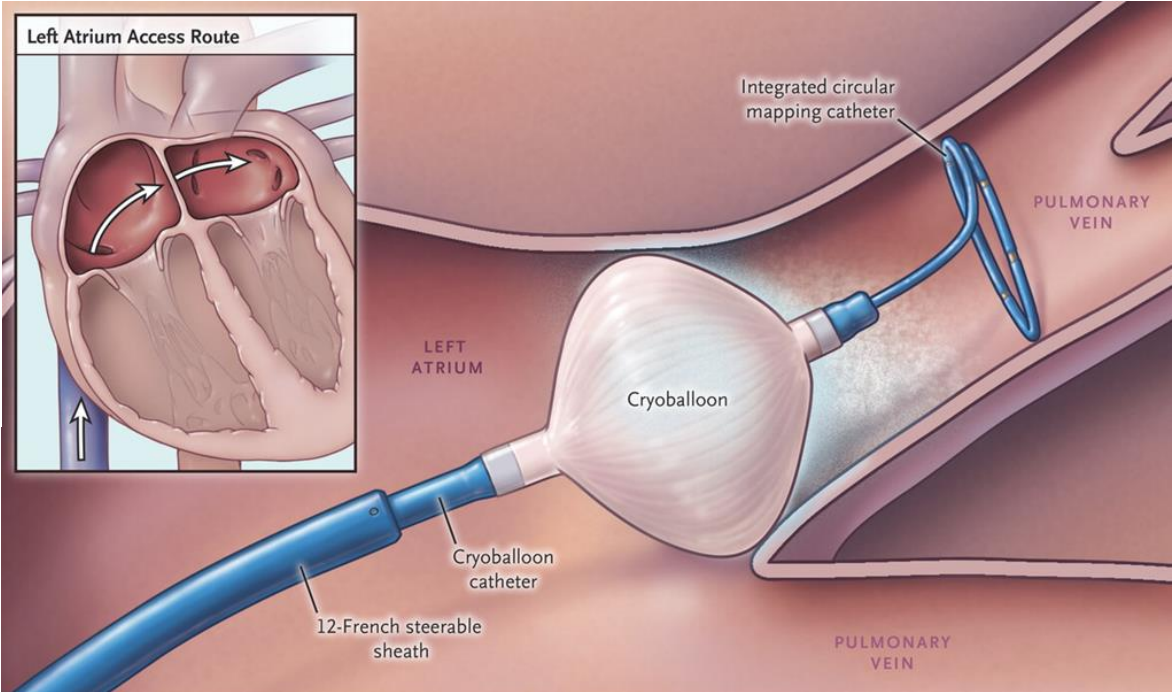
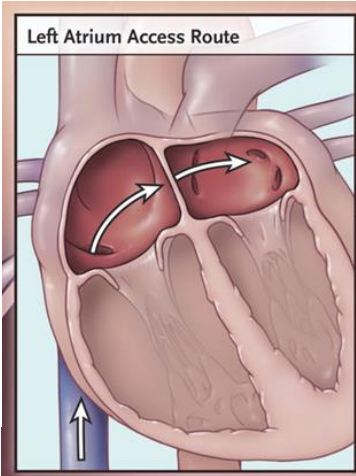
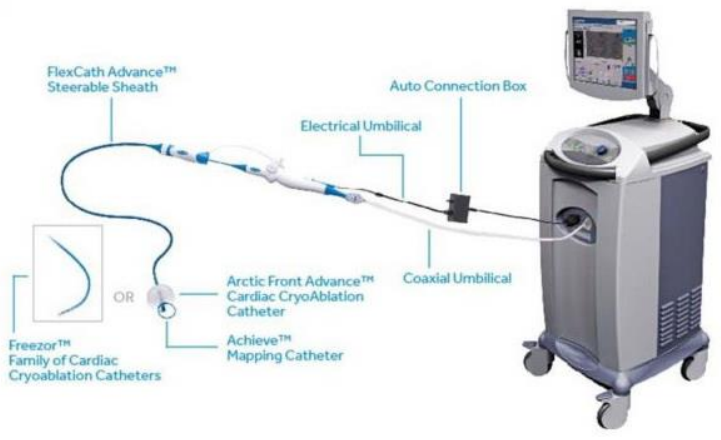
Velocity	Respiration	Distortion
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	200	15
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	-200	-5
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		-15
		-20



36 70 44 22

Score -4  
CL 448ms  
LAT -64ms

ABL @ 0-0



# Who may benefit from catheter ablation?

- **Usually cures** (consider ablation as first line therapy after first event):
  - Most **Paroxysmal SVTs** (>90% curable with single procedure)
  - **WPW syndrome** (>90% curable with single procedure):
    - **WPW with any symptoms suggesting arrhythmia – MUST be referred because of preventable risk of sudden death**
    - Asymptomatic WPW on ECG – EPS+/- ablation optional, but referral recommended
  - **Typical atrial flutter** (>90% curable with single procedure)
- **Usually can provide significant relief and sometimes cure:**
  - Focal atrial tachycardias (10% of all SVT)
  - Atypical atrial flutters (success reduced if after previous cardiac surgery or ablation)
  - Certain focal ventricular arrhythmias (frequent PVCs or VT)
  - **Paroxysmal AF** without structural heart disease or predisposing factors
- **May provide temporary relief, but rarely cure:**
  - Persistent atrial fibrillation (requiring cardioversion, especially if >1-year duration)
  - Ventricular tachycardia in structural heart disease (in patients with ICD shocks)

# General indications for ablation of arrhythmia

- **Symptoms:**

- Frequent and/or severe
- Significant psychological impact due to unpredictability
- Occupation or travel

- **High burden of arrhythmia with detrimental effect on heart function** (regardless of symptoms!):

- Persistent fast heart rate >100 bpm at rest due to atrial flutter or fib
- Very frequent unifocal PVC with burden >20% and refractory to medications +/- resulting LV dysfunction

- **To eliminate risk of SCD that can be caused by arrhythmia:**

- High risk WPW syndrome (symptomatic or high risk by EPS)

# Ablation for Atrial Fibrillation – pulmonary veins ablation (PVA)

- **No evidence it can cure atrial fibrillation:**
  - **Best-case scenario** in **paroxysmal AF** - 70% chances of freedom from AF and AAD at 1 year after PVA, 50% at 5 years after single procedure (multiple procedures may be needed)
  - In **persistent AF** – **50% recurrence within 1 year** after ablation
- **Oral anticoagulation CANNOT be stopped even after “successful” PVA if CHADS-65 is >0**
- Primary reason for PVA is to help with symptoms. Therefore it is **not indicated in asymptomatic persistent AF** (*exceptions apply*)
- Majority of patients do experience **improvement in quality of life** after PVA, but many would remain on AAD (antiarrhythmic drugs)
- Multiple repeat procedures may be required to get AF under control
- **Best candidates for PVA** (most likely to benefit) are:
  - **Younger (<80), highly symptomatic, no or minimal structural heart disease, adequately addressed reversible causes of AF (HTN, EtOH, OSA, obesity, hyperthyroidism, etc)**



# Pulmonary Veins Ablation (PVA) – maximizing success

- **Assess for and address any underlying causes:**
  - Excessive EtOH (>1-2 drinks/day) – nothing will work till EtOH stopped
  - Uncontrolled HTN – nothing will work till HTN controlled
  - Massive obesity – ablation will likely fail unless significant weight loss achieved
  - Obstructive Sleep Apnea – if any suspicion => screen with sleep study (if not treated – PVA will fail)
  - Structural heart disease (LVH, HCM, cardiomyopathy, valvular disease, ASD) – **every new diagnosis of AFIB requires Echo**
  - Hyperthyroidism – treat till euthyroid and then reassess AFIB as intervention for AF may no longer be needed
- **If patient with persistent AF is possible candidate for PVA – we need to keep him/her in normal sinus rhythm as much as possible until ablation (the longer they stay in AF the lower the chances of restoring sinus rhythm – consider cardioversion and antiarrhythmic medications until ablation is done**

## Ablation for Atrial Fibrillation – role of PPM and AV node ablation

- “Pace & Ablate” strategy still can be useful in some patients with atrial fibrillation or atypical flutter
- Permanent pacemaker is implanted 1st and then a couple of months later a very simple and safe AV node ablation procedure would establish permanent complete heart block => absolute rate control with no need for AVN blocking medications
- This strategy is extremely effective, but unfortunately requires implantation of permanent pacemaker on which the patient will be forever dependent
- In younger patients it would be only considered as last resort
- Typical applications would be:
  - Patients who already have permanent pacemaker
  - Patients who have “tachy-brady” variant of sick sinus syndrome (have fast HR and sinus pauses) and need PPM implantation anyway
  - Elderly (>80 yo) or very frail patients (poor candidates for PVA) with very difficult to control persistent AF or paroxysmal Afib
  - Difficult to control AF after failed AAD and previous ablations (especially when at risk for tachycardia-induced cardiomyopathy and heart rate control is paramount)

## Risks of the ablation procedure

- Overall risk considered quite low: <5% risk of all complications
- Most common problem – hematoma or bleeding at femoral access site (extremely rarely any intervention is required)
- <1% risk of damage to normal conduction system, that may require permanent pacemaker implantation
- <1% risk of myocardial perforation causing pericardial tamponade and requiring pericardial drain insertion and a couple of days in the hospital (one in many hundreds may require heart surgery to repair)
- <1% risk of heart attack or stroke
- Some other very rare complications are possible
- Risk of death for most ablation procedures <1:1000 (some palliative ablation of VT in structural heart disease may have mortality >5%)
- **All procedures in our centre are performed by 3 very experienced operators (>1000 procedures each) and currently no trainees/residents are involved in any important steps of the ablation procedures**

# referral → consultation → ablation → follow up

- **Referral:**

- Upon receiving the referral it will be forwarded to one of the 3 ablating physicians (unless it was addressed personally) – Dr. Khadem, Dr. Khoo and Dr. Tischenko
- VERY IMPORTANT: in order to triage the patient appropriately please provide maximum available information and include all relevant tests, especially ECGs, Holters or monitor strips with arrhythmia. Without supporting information we may not be able to assess the true urgency of the situation. **Standard Ablation Referral Form will be uploaded to Cardiac Sciences webpage soon**

- **Clinic:**

- One of us will usually arrange appointment for the patient in our clinic (rarely we would proceed directly to booking ablation, unless the patient had already ablation with us before).
- We will assess if ablation is appropriate and will discuss the risks/benefits and alternatives with patient. If patient decides to proceed with ablation we will put them on waiting list (currently about 10 months for non-urgent cases)

- **Ablation:**

- When the available dates are known the patient will be called by EP coordinator and offered a procedure date
- If agreed on the date the patient will be brought for preop assessment, ECG, bloodwork and teaching a few days before the procedure. Detailed instructions when to stop OAC and AAD will be given
- The patient arrives for procedure fasting (they cannot drive themselves). Many will go home same day, out of towners will need to stay in Winnipeg overnight. Some patients will require overnight admission after complex procedures and after GA

- **Follow up:**

- Most patients will not require follow up after ablation because of the high cure rate (>90% will not need cardiologist after successful ablation)
- We will arrange follow up if there is an ongoing concern or if there is a recurrence of arrhythmia
- We suggest to continue routine follow up with the referring MD and primary MD

# Ablation day – patient’s perspective (1 of 2)

- Patient arrives to Y2 unit at Bergen Cardiac Care Centre in am as instructed
  - Fasting after midnight
  - Stopped his medications as instructed
  - Ideally should come with both of their groins shaved (like for hernia operation)
  - Bringing their CPAP if using it at home
  - Should not drive themselves to the procedure (cannot drive after it)
- The patient will be assessed by EP lab nurses and will meet the EP doctor
  - Procedure, risks and benefits will be explained again, patient will sign consent form
  - IV line will be inserted
- The patient will be brought to EP lab:
  - Monitoring equipment will be applied
  - Conscious sedation will be given (anesthesia service is always available and we can provide very deep sedation if needed and even general anesthesia, but it is rarely needed)
  - PVAs we currently do under General Anesthesia (may change in future) with intraop TEE
  - Patient will be draped and local anesthetic injected at femoral access site
  - Femoral vein then is cannulated with 3-4 introducers and catheters advanced to heart
- EP study – diagnostic part:
  - Patient will experience palpitations and feeling of heart racing while testing is done

# Ablation day – patient’s perspective (2 of 2)

- Ablation:
  - After EP study (diagnostic part) is completed we will do ablation
  - Some discomfort may be present during ablation, but usually very mild (1 “burn” lasts up to one minute in duration, multiple burns often required)
  - More sedation can be provided if needed
  - Procedure takes about 2-3 hours in total
- After ablation:
  - 2-3 hours bed rest in recovery area (usually on 6<sup>th</sup> floor Cardiology)
  - If no problems the patient can usually be discharged home 3-4 hours after completion of procedure
  - After PVA and some other complex ablations patients stay overnight
  - Letter for 1 week off work will be provided if requested
  - Instructions regarding medications changes if any will be provided
  - Complete procedure report will be send to referring MD and primary MD



CFI ZERO GRAVITY

MAVIC

PHILIPS



CRYOCATH





# In summary

- **Ablation is quite safe and well-established treatment option**
- **Ablation can permanently cure:**
  - 90% of all PSVTs (>90% life-long cure after single procedure)
  - Nearly all WPW syndromes (>90% life-long cure after single procedure)
  - >90% of atrial flutters (>90% life-long cure after single procedure)
  - Some VT or frequent PVCs (RVOT)
- **Ablation can significantly improve quality of life:**
  - Symptomatic Paroxysmal Atrial Fibrillation (after all causes addressed)
  - Symptomatic Persistent Atrial Fibrillation (after all causes addressed)
  - Atypical atrial flutters
  - Some non-RVOT VTs and PVCs
  - PPM + AVN ablation in patients with uncontrolled AF after all else failed
- **Ablation is not useful:**
  - Chronic, controlled, especially asymptomatic Atrial Fibrillation
  - To stop OAC in patients with CHADS-65 score >0
  - In inappropriate sinus tachycardia (experimental approach at Mayo)
  - In frequent PACs with no sustained tachyarrhythmias
  - In frequent multifocal PVCs

**Thank you!**